

WHAT IS CLAIMED IS:

1 1. An intravascular balloon catheter comprising:
2 a catheter body having a proximal end, a distal end, and a guidewire lumen
3 therebetween; and
4 a first balloon structure having a passage which is slidably receivable over
5 the catheter body.

1 2. An intravascular balloon catheter as in claim 1, wherein the
2 catheter body comprises a tubular member having at least one lumen.

1 3. An intravascular balloon catheter as in claim 1, wherein a
2 perimeter of the catheter body has a circular, oblong, or elliptical shape.

1 4. An intravascular balloon catheter as in claim 1, wherein the distal
2 end of the catheter body is axially tapered for a length of at least 3 mm.

1 5. An intravascular balloon catheter as in claim 1, further comprising
2 an atraumatic tip at the distal end of the catheter body.

1 6. An intravascular balloon catheter as in claim 1, wherein the
2 catheter body is formed from a polymer material, a composite material, a braided
3 material, or a metal material.

1 7. An intravascular balloon catheter as in claim 1, wherein the
2 catheter body comprises multiple tubular members coupled to one another.

1 8. An intravascular balloon catheter as in claim 1, wherein the balloon
2 structure comprises an inflation tube extending proximally from the balloon when the
3 balloon is disposed near the distal end of the catheter body.

1 9. An intravascular balloon catheter as in claim 8, wherein the
2 inflation tube has sufficient column strength to advance the balloon structure over the
3 catheter body.

1 10. An intravascular balloon catheter as in claim 8, wherein an axial
2 groove is formed over at least a portion of the length of the inflation tube to removably
3 receive a portion of the catheter body.

1 11. An intravascular balloon catheter as in claim 10, wherein the
2 groove has a length in the range from 10 cm to 150 cm and an opening in the range from
3 0.001 inches to 0.014 inches.

1 12. An intravascular balloon catheter as in claim 8, wherein the
2 inflation tube has a length in the range from 10 cm to 150 cm.

1 13. An intravascular balloon catheter as in claim 1, wherein the
2 catheter body has an inflation lumen which mates with an inflation port on the balloon
3 structure wherein the balloon structure is disposed near the distal end of the catheter
4 body.

1 14. An intravascular balloon catheter as in claim 13, wherein the
2 balloon structure comprises a deployment shaft extending proximally from the balloon
3 when the balloon is disposed near the distal end of the catheter body.

1 15. An intravascular balloon catheter as in claim 1, wherein the
2 catheter body is substantially free from structure at the proximal end which would
3 interfere with passage of the balloon structure over the proximal end of the catheter body.

1 16. An intravascular balloon catheter as in claim 1, further comprising
2 an expandable vascular prosthesis disposed over the first balloon structure.

1 17. An intravascular balloon catheter system comprising a balloon
2 catheter as in claim 1, further comprising a second balloon structure having a passage
3 which is slidably receivable over the catheter body.

1 18. An intravascular balloon catheter system as in claim 17, further
2 comprising an expandable vascular prosthesis disposed over the second balloon structure.

1 19. An intravascular balloon catheter as in claim 1, wherein the
2 catheter body is axially slit over at least a portion of the length of the guidewire lumen.

1 20. An intravascular balloon catheter as in claim 1, wherein the
2 catheter body is spirally slit over at least a portion of the length of the guidewire lumen.

- 1 21. An intravascular balloon catheter as in claim 1, wherein an axial
2 slit is formed over at least a portion of the length of the catheter body to removably
3 receive an inflation tube of the balloon structure.
- 1 22. An intravascular balloon catheter as in claim 1, wherein the
2 catheter body has a length in the range from 50 cm to 200 cm, and outer diameter in the
3 range from 1 F to 10 F, and a guidewire lumen diameter in the range from 0.2 mm to
4 2 mm.
- 1 23. An intravascular balloon catheter as in claim 1, wherein the balloon
2 structure further comprises an inner sleeve having an inflatable balloon disposed over an
3 outer surface of the inner sleeve, wherein the passage is formed axially in the inner
4 sleeve.
- 1 24. An intravascular balloon catheter as in claim 23, wherein the inner
2 sleeve has a length in the range form 3 cm to 50 cm and the inflatable balloon has a
3 length in the range from 1 cm to 5 cm.
- 1 25. An intravascular balloon catheter as in claim 23, wherein at least a
2 portion of the inner sleeve is slidably receivable over the catheter body.
- 1 26. An intravascular balloon catheter as in claim 1, further comprising
2 a deployable embolic capture element on the catheter body.
- 1 27. An intravascular balloon catheter as in claim 26, wherein the
2 deployable embolic capture element is located within 20 cm of the distal end of the
3 catheter body.
- 1 28. An intravascular balloon catheter as in claim 1, further comprising
2 a deployable embolic capture element on the first balloon structure.
- 1 29. An intravascular balloon catheter as in claim 1, further comprising
2 a second balloon on the catheter body.
- 1 30. An intravascular balloon catheter as in claim 29, further comprising
2 an expandable vascular prostheses disposed over the second balloon.

1 31. An intravascular balloon catheter as in claim 1, further comprising
2 a self-expanding vascular prosthesis on the catheter body.

1 32. An intravascular balloon catheter as in claim 31, wherein the
2 vascular prosthesis is distal the balloon structure in an unexpanded state.

1 33. An intravascular balloon catheter as in claim 31, wherein the
2 vascular prosthesis is at least partially under the balloon structure in an unexpanded state.

1 34. An intravascular balloon catheter as in claim 1, further comprising
2 an atherectomy element coupled to the distal end of the catheter body.

1 35. An intravascular balloon catheter as in claim 1, further comprising
2 at least one pressure sensor coupled to the distal end of the catheter body.

1 36. An intravascular balloon catheter as in claim 1, further comprising
2 at least one infusion port at the distal end of the catheter body.

1 37. An intravascular balloon catheter as in claim 1, further comprising
2 a second catheter body having a passage which is slidably receivable over the catheter
3 body.

1 38. A method for balloon exchange over a catheter body, said method
2 comprising:
3 withdrawing a first balloon structure over a catheter body in a proximal
4 direction, wherein said catheter body remains in place over a guidewire in a blood vessel;
5 and
6 introducing a second balloon structure over the catheter body in a distal
7 direction, wherein said catheter body remains in place over the guidewire in a blood
8 vessel.

1 39. A method as in claim 38, wherein the balloon structure that is
2 introduced over the catheter body is not the same as the balloon structure that is
3 withdrawn over the catheter body.

1 40. A method as in claim 38, further comprising expanding the first
2 and second balloon structures which have been introduced to the blood vessel.

1 41. A method as in claim 40, wherein at least one of the balloon
2 structures are carrying a vascular prosthesis which is deployed into the blood vessel by
3 balloon expansion.

1 42. A method as in claim 40, wherein expanding the balloon structure
2 comprises introducing an inflation medium through an inflation tube connected to the
3 balloon structure.

1 43. A method as in claim 40, wherein expanding the balloon structure
2 comprises introducing an inflation medium through an inflation lumen in the catheter
3 body.

1 44. A method for balloon withdrawal over a catheter body, said
2 method comprising:
3 withdrawing a first balloon structure over a catheter body in a proximal
4 direction, wherein said catheter body remains in place over a guidewire in a blood vessel.

1 45. A method for balloon introduction over a catheter body, said
2 method comprising:
3 introducing a first balloon structure over the catheter body in a distal
4 direction, wherein said catheter body remains in place over the guidewire in a blood
5 vessel.

1 46. A kit comprising:
2 a catheter body;
3 a first balloon structure removably replaceable over the catheter body; and
4 instructions for use setting forth a method as in claim 15.

1 47. A kit as in claim 46, further comprising a second balloon structure.